Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-34 (cancelled).

35. (previously presented) A method of flowing blood from a heart chamber to a coronary vessel, the method comprising:

providing a conduit with a first end and a second end;

providing a natural valve;

placing the conduit within a heart wall such that the first end of the conduit is open towards the heart chamber and the second end is open towards the blood vessel; and

during diastole, restricting a flow of blood from the coronary vessel to the heart chamber via the natural valve.

36. (previously presented) The method of claim 35, wherein providing the natural valve includes providing the natural valve inside the conduit.

37. (previously presented) The method of claim 35, wherein providing the natural valve includes providing a section of blood vessel containing at least one naturally occurring valve.

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38. (previously presented) The method of claim 37, wherein the section of blood vessel is a human vein.

39. (previously presented) The method of claim 37, wherein the section of blood vessel is an autograft.

40. (previously presented) The method of claim 37, wherein the section of blood vessel is an allograft.

41. (previously presented) The method of claim 37, wherein the section of blood vessel is a xenograft.

42. (previously presented) The method of claim 35, wherein the heart chamber is a left ventricle.

43. (previously presented) The method of claim 35, wherein the coronary vessel is a coronary artery.

44. (previously presented) A bypass system for implantation in a body of a patient, the system comprising:

a tube having a first end and a second end and being configured to be implanted in a heart wall such that the first end is open towards a heart chamber and the second

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end is open towards a coronary vessel, the tube being further configured to permit blood to flow therethrough from the heart chamber to the coronary vessel; and

a natural valve configured to restrict blood flow from the coronary vessel to the heart chamber during diastole.

45. (previously presented) The system of claim 44, wherein the natural valve is disposed inside the tube.

46. (previously presented) The system of claim 44, wherein the natural valve includes a section of blood vessel containing at least one naturally occurring valve.

47. (previously presented) The system of claim 46, wherein the section of blood vessel lines an interior of the tube.

48. (previously presented) The system of claim 46, wherein the section of blood vessel is a human vein.

49. (previously presented) The system of claim 46, wherein the section of blood vessel is an autograft.

50. (previously presented) The system of claim 46, wherein the section of blood vessel is an allograft.

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51. (previously presented) The system of claim 46, wherein the section of blood vessel is a xenograft.

52. (previously presented) The system of claim 44, wherein the heart chamber is a left ventricle.

53. (previously presented) The system of claim 44, wherein the coronary vessel is a coronary artery.

54. (new) A method for performing bypass on a vessel by placing the vessel in fluid communication with a heart chamber containing blood, the method comprising steps of:

(a) providing a first vessel having a lumen, the first vessel being sized and configured for being joined to a second vessel having a lumen that is at least partially obstructed;

(b) placing at least a portion of the first vessel adjacent the lumen of the second vessel downstream of the obstruction so as to place the lumens of the first and second vessels in fluid communication;

(c) fixing the first vessel in position with respect to the lumen of the second vessel without using suture to form a substantially suture-free anastomosis between the first and second vessels; and

(d) placing the first vessel in fluid communication with a heart chamber containing blood so as to deliver blood from the heart chamber to the lumen of the second vessel.

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55. (new) The method of claim 54, further comprising a vessel coupling secured to the first vessel and configured to be anastomosed to the second vessel without suture.

56. (new) The method of claim 55, wherein the vessel coupling is an expandable conduit that is placed at least partially into the lumen of the second vessel and expanded to engage the second vessel and form the anastomosis.

57. (new) The method of claim 56, wherein the expandable conduit is a stent secured to the first vessel by suture and step (c) is carried out without using any suture.

58. (new) The method of claim 56, wherein the first vessel comprises a combination of autologous tissue and synthetic graft material adapted to be anastomosed to a coronary artery.

59. (new) The method of claim 58, wherein the heart chamber is the left ventricle.

60. (new) The method of claim 59, wherein the first vessel communicates with the left ventricle via a flow path passing through the myocardium.

61. (New) The method of claim 59, wherein the anastomosis is formed to

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permit native blood flow through the coronary artery to flow past the site of the anastomosis.

62. (new) A method for bypassing an obstruction in a coronary artery by placing the coronary artery in fluid communication with a heart chamber containing blood, the method comprising steps of:

(a) providing a stent-graft assembly including a stent movable between expanded and non-expanded orientations and a graft vessel attached to the stent;

(b) forming an opening in the wall of the coronary artery that is sized to allow at least a portion of the stent to be positioned in the lumen of the coronary artery when the stent is in the non-expanded orientation;

(c) positioning at least a portion of the stent in the lumen of the coronary artery and expanding the stent into contact with the coronary artery to form a substantially suture-free anastomosis between the graft vessel and the coronary artery; and

(d) placing the graft vessel in communication with a heart chamber containing blood.

63. (new) The method of claim 62, wherein the stent is loaded on a balloon in the non-expanded orientation and the balloon is expanded during step (c).

64. (new) The method of claim 62, wherein the stent-graft assembly is secured to the coronary artery without completely occluding the lumen of the coronary

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artery so as to allow blood flowing in the coronary artery to flow past the site of the anastomosis.

65. (new) A device for forming an anastomosis between a graft vessel and a target vessel during a bypass procedure in which the target vessel is placed in fluid communication with a heart chamber containing blood, the device comprising:

a vessel coupling configured to secure a graft vessel to a target vessel, the vessel coupling having a lumen and being movable between expanded and non-expanded orientations;

a graft vessel secured to the vessel coupling, a portion of the graft vessel being adapted to be placed in fluid communication with a heart chamber containing blood;

an expansion mechanism for expanding the vessel coupling to the expanded orientation in order to form an anastomosis between the vessel coupling and the target vessel without using suture;

wherein the vessel coupling is sized and configured to fit at least partially within the lumen of a coronary artery in said non-expanded orientation and to engage the coronary artery in said expanded orientation.

66. (new) The device of claim 65, further comprising a support member supporting the vessel coupling and the graft vessel, the support member adapted to be at least partially placed in the lumen of the target vessel.

67. (New) The device of claim 66, wherein the expansion mechanism

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comprises a balloon carried by the support member, and further comprising means for coupling the balloon to a source of pressurized fluid for expanding the vessel coupling to the expanded orientation.

68. (new) The device of claim 67, wherein the vessel coupling is a stent and the graft vessel comprises a combination of autologous tissue and synthetic graft material.

69. (new) The device of claim 68, further comprising a sheath overlying the vessel coupling and the graft vessel, the sheath being removed to selectively expose the vessel coupling and the graft vessel.

70. (new) The device of claim 65, wherein the vessel coupling is configured with a plurality of open areas.

71. (new) A device for performing a bypass procedure in which a suture-free anastomosis is formed between a graft vessel and a coronary artery, and wherein the graft vessel is placed in communication with a heart chamber containing blood to deliver blood from the heart chamber to the coronary artery, the device comprising:

a stent-graft assembly including a stent movable between collapsed and expanded orientations and a graft vessel having a lumen; and

an expansion mechanism for expanding the stent to the expanded orientation once the stent has been at least partially positioned in the lumen of a coronary artery;

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wherein the stent and graft vessel are sized and configured to be collapsed for placement in the lumen of the coronary artery and then expanded to cause the stent to engage the wall of the coronary artery to anastomose the stent-graft assembly to the coronary artery without suture.

72. (new) The device of claim 71, wherein the stent-graft assembly is configured to permit blood flowing through the coronary artery from the aorta to move past the site of the anastomosis.

73. (new) A method for placing a target vessel in fluid communication with a heart chamber containing blood while preserving native blood flow through the target vessel, the method comprising steps of:

(a) providing a graft vessel selected from the group consisting of tissue grafts, synthetic grafts, and grafts formed of both tissue and synthetic material, wherein the graft vessel has a lumen and is adapted to be secured to a target vessel having a lumen;

(b) fixing at least a portion of the graft vessel to the target vessel without using suture to form a substantially suture-free anastomosis between the graft and target vessels that is distal to the obstruction in the target vessel;

(c) placing the graft vessel in fluid communication with a heart chamber containing blood; and

(d) allowing any native blood flow in the target vessel to move past the site of the anastomosis.

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74. (new) The method of claim 73, further comprising securing a vessel coupling to the graft vessel and anastomosing the vessel coupling to the second vessel without using suture.

75. (new) The method of claim 74, wherein the graft vessel comprises a synthetic portion in communication with the target vessel and a tissue portion in communication with the heart chamber.

D1

76. (new) The method of claim 73, wherein the graft vessel comprises a synthetic portion in communication with the target vessel and a tissue portion in communication with the heart chamber.

77. (new) The method of claim 75, wherein the tissue portion of the graft vessel comprises a section of saphenous vein.

78. The method of claim 74, wherein the vessel coupling comprises an expandable conduit disposed over an expansion mechanism, and step (b) is carried out by expanding the expansion mechanism to force the expandable conduit against the target vessel.

79. (new) The method of claim 74, wherein the vessel coupling comprises a frame configured to be retained within the lumen of the target vessel while not blocking blood flow in the target vessel, and the frame is collapsed for insertion into the target

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vessel and then expanded against the wall of the target vessel.

80. (new) The method of claim 74, wherein step (b) is carried out without suturing the graft vessel to the target vessel.

81. The method of claim 74, further comprising coupling an end of the graft vessel to a tubular element adapted to communicate with the heart chamber, and fixing the tubular element to the myocardium so as to extend into the heart chamber and place the graft vessel in fluid communication with the heart chamber.

82. (new) A device for performing a bypass procedure in which a target vessel is placed in communication with a heart chamber containing blood and an anastomosis is formed between a graft vessel and the target vessel that allows native blood flow through the target vessel, the device comprising:

a graft vessel adapted to be anastomosed to a target vessel and placed in communication with a heart chamber containing blood;

a vessel coupling secured to the graft vessel, wherein the vessel coupling has a lumen and is configured to be anastomosed to the target vessel to place the graft and target vessels in fluid communication; and

wherein the vessel coupling is secured to the graft vessel so as to allow blood flow through the target vessel to move past the site of the anastomosis.

83. (new) The device of claim 82, wherein the vessel coupling comprises a

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first portion secured to the graft vessel and a second portion sized and configured to engage the interior of the wall of the target vessel to fix the vessel coupling in place.

84. (new) The device of claim 83, wherein the first portion of the vessel coupling comprises a stent and the second portion of the vessel coupling comprises an attachment mechanism that engages the lumen of the target vessel.

D1

85. (new) The device of claim 82, further comprising a support member supporting the vessel coupling and the graft vessel, wherein the support member is adapted to be at least partially placed in the lumen of the target vessel.

86. (new) The device of claim 82, further comprising a removable sheath overlying the vessel coupling and the graft vessel.

87. (new) The device of claim 82, wherein the vessel coupling is configured to be fixed to the target vessel without suture to form a suture-free anastomosis.

88. (new) A device for use in performing a bypass procedure in which a first vessel is placed in fluid communication with a heart chamber containing blood and anastomosed to a second vessel with a lumen containing an obstruction, the device comprising:

a vessel coupling including first and second portions for forming an anastomosis between a first vessel and a second vessel;

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wherein the first portion of the vessel coupling is configured to be coupled to a first vessel that is in fluid communication with a heart chamber containing blood so that blood flows from the heart chamber and through the coupling; and

wherein the second portion of the vessel coupling is configured to be secured to a second vessel without using suture to form a substantially suture-free anastomosis that allows native blood flow through the second vessel to move past the site of the anastomosis.

89. (new) The device of claim 88, wherein at least the second portion of the vessel coupling is collapsed for introduction into the second vessel and then expanded to engage the wall of the second vessel to form the anastomosis.

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